LISTING OF THE CLAIMS:

Claims 1-27 (Cancelled)

28. (Currently Amended) A semiconductor device comprising at least one substantially planarized trench isolation region formed within a substrate electrically isolating adjacent active device regions from each other, said at least one planarized trench isolation region containing a conformal oxide liner confined within and along sidewalls of said at least one planarized trench isolation region, wherein said conformal oxide liner has rounded corners ~~between a~~ extending beyond a top surface of said substrate and a trench dielectric filling said at least one substantially planarized trench isolation region.

29. (Original) The semiconductor device of Claim 28 wherein said substrate is composed of Si, Ge, SiGe, GaAs, InAs, InP or a layered semiconductor.

30. (Original) The semiconductor device of Claim 28 wherein said at least one planarized trench isolation region comprises a deep trench isolation region, a moderate trench isolation region, a shallow trench isolation region or any combinations thereof.

31. (Original) The semiconductor device of Claim 30 wherein said at least one planarized trench isolation region is a shallow trench isolation region.

32. (Original) The semiconductor device of Claim 28 wherein said at least one planarized trench isolation region includes a thermally grown oxide liner and a trench dielectric material.

33. (Original) The semiconductor device of Claim 32 wherein said trench dielectric material is tetraethylorthosilicate (TEOS), SiO_2 or a flowable oxide.

34. (Newly Added) A semiconductor device comprising at least one substantially planarized trench isolation region formed within a substrate electrically isolating adjacent active device regions from each other, said at least one planarized trench isolation region containing a dielectric fill and a conformal thermal oxide liner confined within and along sidewalls of said at least one planarized trench isolation region, wherein said conformal oxide liner has edges having rounded portions extending from a conformal oxide liner/substrate interface and a conformal oxide liner/dielectric fill interface, wherein said rounded portions extend beyond top surface is said substrate.

REMARKS

Favorable reconsideration of this application in view of the remarks to follow is respectfully requested.

Before addressing the specific rejections raised in the Final Rejection dated April 10, 2003, applicant has amended Claim 28 and added new Claim 34. Claim 28 has been amended to recite where the "conformal oxide liner has rounded corners extending beyond a top surface of said substrate". Newly added Claim 34 is directed to a semiconductor device comprising at least one substantially planarized trench isolation region formed within a substrate where the trench isolation region includes a conformal oxide liner and dielectric fill, where the conformal oxide liner includes edges having rounded portions extending from a conformal oxide liner/substrate interface and conformal oxide liner/dielectric fill interface, wherein said portions extend beyond a top surface of said substrate. Support for the amendment to Claim 28 and newly added Claim 34 is found on Page 12, paragraph 1, of applicant's specification and FIG 2E.

Claims 28 – 33 were rejected in the Final Rejection under 35 U.S.C. §102(e) as allegedly anticipated by U.S. Patent No. 5,970,362 to Lyons, et al. ("Lyons, et al."). It is the Examiner's position, referring to Page 2 of the previous Office Action, that Lyons, et al. disclose the limitations of, "trench isolation regions formed within a substrate (24, Fig. 2D) electrically isolating adjacent active device regions from each other, said planarized trench isolation regions containing a conformal oxide liner (25, Fig. 2F) confined within and along sidewalls of said planarized trench isolation region, wherein said conformal oxide liner has rounded corners 38 between the top surfaces of the substrate and a trench dielectric filling (26, Fig. 2G) said trench (col. 5, lns. 1-26)". Applicant respectfully disagrees and submits the following.

It is axiomatic that anticipation under §102 requires the prior art reference to disclose every element to which it is applied. In re King, 801 F.2d 1324, 1326, 231 USPQ 36, 138 (Fed Cir, 1986). Thus, there must be no differences between the subject matter of the claim and the disclosure of the prior art reference. Stated another way, the reference must contain within its four corners adequate direction to practice the invention as claimed. The corollary of the rule is equally applicable: absence from the applied reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 1571, 230 USPQ 81, 84 (Fed. Cir. 1986).

Applicant submits that the claims of the present application are not anticipated by the disclosure of Lyons, et al., since the applied reference does not disclose applicant's claimed structure. Specifically, Lyons, et al. do not teach a semiconductor device comprising a planarized trench isolation region 116 containing a conformal oxide liner 112 confined within and along sidewalls of said planarized trench isolation regions 116, where said *conformal oxide liner 112 has rounded corners 115* extending beyond the top surface of the substrate 100 and a trench dielectric 114 filling the substantially planarized trench isolation region, as recited in amended Claim 28.

Applicant's claimed structure, as depicted in Fig. 2E, includes a trench isolation region where a trench 110 is formed in a substrate 100 and is conformally lined with an oxide layer 112 that terminates *with rounded corners 115* at the junction between the top surfaces of the substrate 100 and the trench dielectric 114. Referring to FIG. 2E, applicant has determined that by forming a conformal oxide liner having rounded corners extending beyond the surface of the substrate that the incidence of divots is reduced. Referring to Page 12, lines 10-15, applicant discloses that divot formation is substantially phased away because the conformal oxide liner 112 etches at a slower rate than the trench dielectric material 114. Applicant further discloses that the "differential in etch rate prevents the formation of a divot at the

STI/substrate corner" and that "instead rounded corners 115 are formed in the present invention, as shown in Fig. 2E." Applicant notes that the incidence of divots extending below the surface of the substrate is overcome by the inventive conformal oxide liner having rounded corners 115 at the conformal oxide liner/substrate interface and conformal oxide liner/dielectric fill interface, where the rounded corners extend beyond the surface of the substrate.

Lyons, et al. do not anticipate applicant's claimed structure because Lyons, et al. fail to teach a conformal oxide liner having rounded corners extending beyond the surface of the substrate, as recited in amended Claim 28. Lyons, et al. produce a planar shallow trench isolation structure by forming a trench in a substrate, depositing a conformal oxide layer 25 within the trench, and filling the trench with an insulating material 24. Referring to Column 3, lines 25-30, Lyons, et al. disclose where the insulating material 24 filling the trench and the conformal oxide layer 25 are both silicon dioxide. "Adverting to FIG. 2H, subsequent to trench filling, planarization is effected, as by CMP, to polish the insulating material 26 until the main surface 21a of the substrate 21 and the uppermost surface 26a of the insulating material 26 are substantially coplanar." *See* Column 5, lines 20-25." Still referring to FIG. 2H, the planarized conformal oxide layer 25 disclosed in Lyons, et al. does not have rounded corners that extend beyond the substrate surface.

It is the Examiner's position that, "it would be inherent that the liner material would form rounded corners because the liner and filler material are the same, therefore the CMP process would naturally yield rounded corners." Applicant respectfully disagrees and submits the following.

When anticipation is based on inherency of limitations not expressly disclosed in the assertedly anticipating reference, it must be shown that the undisclosed information was known to be present in the subject matter of the reference. See *Elan Pharmaceuticals, Inc., v.*

Mayo Foundation for Medical Education and Research, 304 F.3d 1221, 1228, 64 USPQ2d 1292 (Fed. Cir. 2002) (*citing Continental Can*, 948 F.2d at 1269). Applicant, as discussed above, has determined that a reduction in divot formation results from the formation of rounded conformal oxide liner corners 115, which are the result of an etch differential between the conformal oxide liner 112 and the trench dielectric 114. To establish inherency the alleged limitation must be necessarily present so that one of ordinary skill would recognize its presence. *See Crown Operations International, LTD v. Solutia Inc.*, 289 F.3d 1367, 1377, 62 USPQ2d 1917 (Fed. Cir. 2002). Applicant submits that one skilled in the art reading Lyons, et al. would not interpret the oxide liner disclosed in Lyons, et al. to have rounded corners as claimed by the applicant; since Lyons, et al. do not specifically disclose an oxide liner having rounded corners or recognize that an etch differential between the conformal oxide liner 112 and the trench dielectric 114 results in the formation of a conformal oxide liner having rounded corners. Therefore, applicant's conformal oxide liner having rounded corners is not inherent in the disclosure of Lyons, et al.

Applicant further submits that in the claimed structure the liner having rounded corners extends above the upper surface of the substrate. In the applied reference, the liner and trench fill dielectric are coplanar with the upper surface of the substrate. The applied reference des not disclose a structure having a liner having rounded corners that extends above the upper surface of the substrate.

The forgoing remarks clearly demonstrate that the applied reference does not teach each and every aspect of the claimed invention as required by King and Kloster Speedsteel; et al., therefore, the claims of the present application are not anticipated by the disclosure of Lyons, et al. Applicant respectfully submits that the instant §102 rejection has been obviated and withdrawal thereof is respectfully requested.

Wherefore reconsideration and allowance of the claims of the present application are respectfully requested.

Respectfully submitted,

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